

3RD INTERNATIONAL RED SEA EMERGENCY MEDICINE CONFERENCE



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King Faisal Specialist Hospital & Research Centre
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Approach to Low-risk Chest pain

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No Disclosures

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The Way We Were

- Few ED discharges for chest pain
- Hospital admission on heparin
- Rise of chest pain centers
- ACC/AHA recommendations and use of provocative testing



What has changed?

- High-sensitivity troponins
 - 12-hour -> 1-hour rule outs
- Decision rules
 - Very low risk can be discharged from the ED
- Provocative testing not predictive of bad outcomes



ED Chest Pain work-up

- 10-minute EKG
 - To rule out STEMI
 - Graff rule
 - Graff et al. Ann Emerg Med 2000 36:6; 554-60.
- Initial history and physical
 - PE – gestalt, PERC, Wells
 - Dissection – Aortic Dissection Detection Risk Score (ADD-RS)
 - Acute Coronary Syndrome
 - POC troponin for high-risk or unstable patients
 - Avoid "routine" troponin on young patients
 - Consider risk stratification tool.



Clinical Policy: Critical Issues in the Evaluation and Management of Emergency Department Patients With Suspected Non-ST-Elevation Acute Coronary Syndromes



From the American College of Emergency Physicians Clinical Policies Subcommittee
Non-ST-Elevation Acute Coronary Syndromes:

Christian A. Tomaszewski, MD, MS, MBA (Subcommittee Chair)
David Nestler, MD, MS
Kaushal H. Shah, MD
Amita Sudhir, MD
Michael D. Brown, MD, MSc (Committee Co-Chair)

CRITICAL QUESTIONS

1. In adult patients without evidence of ST-elevation ACS, can initial risk stratification be used to predict a low rate of 30-day MACE?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. In adult patients without evidence of ST-elevation ACS, the History, ECG, Age, Risk factors, Troponin (HEART) score can be used as a clinical prediction instrument for risk stratification. A low score (≤ 3) predicts 30-day MACE miss rate within a range of 0% to 2%.

Level C recommendations. In adult patients without evidence of ST-elevation ACS, other risk-stratification tools, such as Thrombolysis in Myocardial Infarction (TIMI), can be used to predict rate of 30-day MACE.



Table 4. Alternative clinical prediction instruments for risk stratification of chest pain patients.

Score	Reference	Class	N	Outcome	MACE, No. (%)	Troponin	Sensitivity (95% CI)	Specificity (95% CI)
North American Chest Pain Rule	Hess et al ²¹	II	2,718	30-day MACE	336 (12)	conv T	100% (97.2% to 100%)	20.9% (16.9% to 24.9%)
Manchester Acute Coronary Syndrome	Body et al ⁴⁸	III	463	30-day MACE	2 (1.6)	hs T	98.0% (93.0% to 99.8%)	Not reported
	Body et al ³⁷	III	456	30-day MACE	2 (2.3)	hs T	97.9% (92.8% to 99.8%)	23.4% (92.8% to 99.9%)
	Body et al ⁵⁸	III	1,459	30-day MACE/ACS	212 (14.5)	hs T	98.1% (95.22% to 99.5%)	47.0% (44.2% to 49.8%)
Vancouver chest pain rule	Scheuermeyer et al ³⁹	III	1,116	30-day ACS	120 (10.8)	conv T	100% (97.6% to 100%)	Not reported
	Scheuermeyer et al ⁴⁹	III	960	30-day ACS	119 (13.1)	hs T	99.2% (95.4% to 100%)	23.4% (20.6% to 26.5%)
	Carlton et al ⁴⁰	III	867	30-day MI	66 (7.6)	hs I	100% (9.3% to 100%)	16.7% (16.2% to 16.7%)
	Cullen et al ⁵⁰	III	200	30-day ACS	4 (1.9)	hs T	98.8% (97% to 99.5%)	15.8% (13.9% to 17.9%)
GRACE	Lyon et al ³⁸	III	760	30-day MACE	123 (16)	Not reported	100% (96% to 100%)	Not reported
	Carlton et al ⁴⁰	III	867	30-day MI	66 (7.6)	hs I	89.4% (79.1% to 95.2%)	34.3% (33.5% to 34.8%)
	Lee et al ²⁷	III	4,743	30-day MACE	319 (6.7)	Not reported	99.5% (97.4% to 99.9%)	Not reported
	Chen et al ⁴¹	III	833	30-day MACE	90 (10.8)	conv T	72.2% (61.8% to 81.1%)	49.9% (46.3% to 53.6%)
NHF Australia/New Zealand	Macdonald et al ²⁸	III	1,666	30-day MACE	219 (13.1)	conv various	99% (97.3% to 99.7%)	Not reported
EDACS	Than et al ⁴⁵	III	608	30-day MACE	79 (13.0)	Not reported	100% (94.2% to 100%)	100% (94.2% to 100%)
	Stopyra et al ⁴⁶	III	282	30-day MACE	17 (6.0)	hs I	88.2% (63.6% to 98.5%)	70.2% (64.3% to 75.6%)
Banach	Chen et al ⁴¹	III	833	30-day MACE	90 (10.8)	conv T	75.6% (65.4% to 85.0%)	44.8% (41.2% to 48.5%)
m-Goldman	Carlton et al ⁴⁰	III	867	30-day MI	66 (7.6)	hs I	98.5% (91.0% to 99.9%)	12.6% (12.0% to 12.7%)

ACS, acute coronary syndrome; CI, confidence interval; conv, conventional; EDACS, Emergency Department Assessment of Chest pain Score; GRACE, Global Registry of Acute Coronary Events; MACE, major adverse cardiac event; MI, myocardial infarction; NHF Australia/New Zealand, National Heart Foundation of Australia/Cardiac Society of Australia and New Zealand.

What is low risk?

The HEART Score for Chest Pain Patients in the ED		
History	- Highly Suspicious - Moderately Suspicious - Slightly or Non-Suspicious	2 points 1 point 0 points
ECG	- Significant ST-Depression - Nonspecific Repolarization - Normal	2 points 1 point 0 points
Age	≥ 65 years > 45 - < 65 years ≤ 45 years	2 points 1 point 0 points
Risk Factors	≥ 3 Risk Factors or History of CAD 1 or 2 Risk Factors - No Risk Factors	2 points 1 point 0 points
Troponin	≥ 3 x Normal Limit > 1 - < 3 x Normal Limit ≤ Normal Limit	2 points 1 point 0 points
Risk Factors: DM, current or recent (<one month) smoker, HTN, HLP, family history of CAD, & obesity		
Score 0 - 3: 1.7% MACE over next 6 weeks; Score 4 - 6: 16.6% MACE over next 6 weeks; Score 7 - 10: 50.1% MACE over next 6 weeks		

Backus BE et al. A Prospective Validation of the HEART Score for Chest Pain Patients at the Emergency Department. International Journal of Cardiology. 2013. 168; 2153 - 2158. PMID: 23465250



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Serial troponin

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Role for troponin

2. In adult patients with suspected acute NSTEMI/ACS, can troponin testing within 3 hours of ED presentation be used to predict a low rate of 30-day MACE?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. None specified.

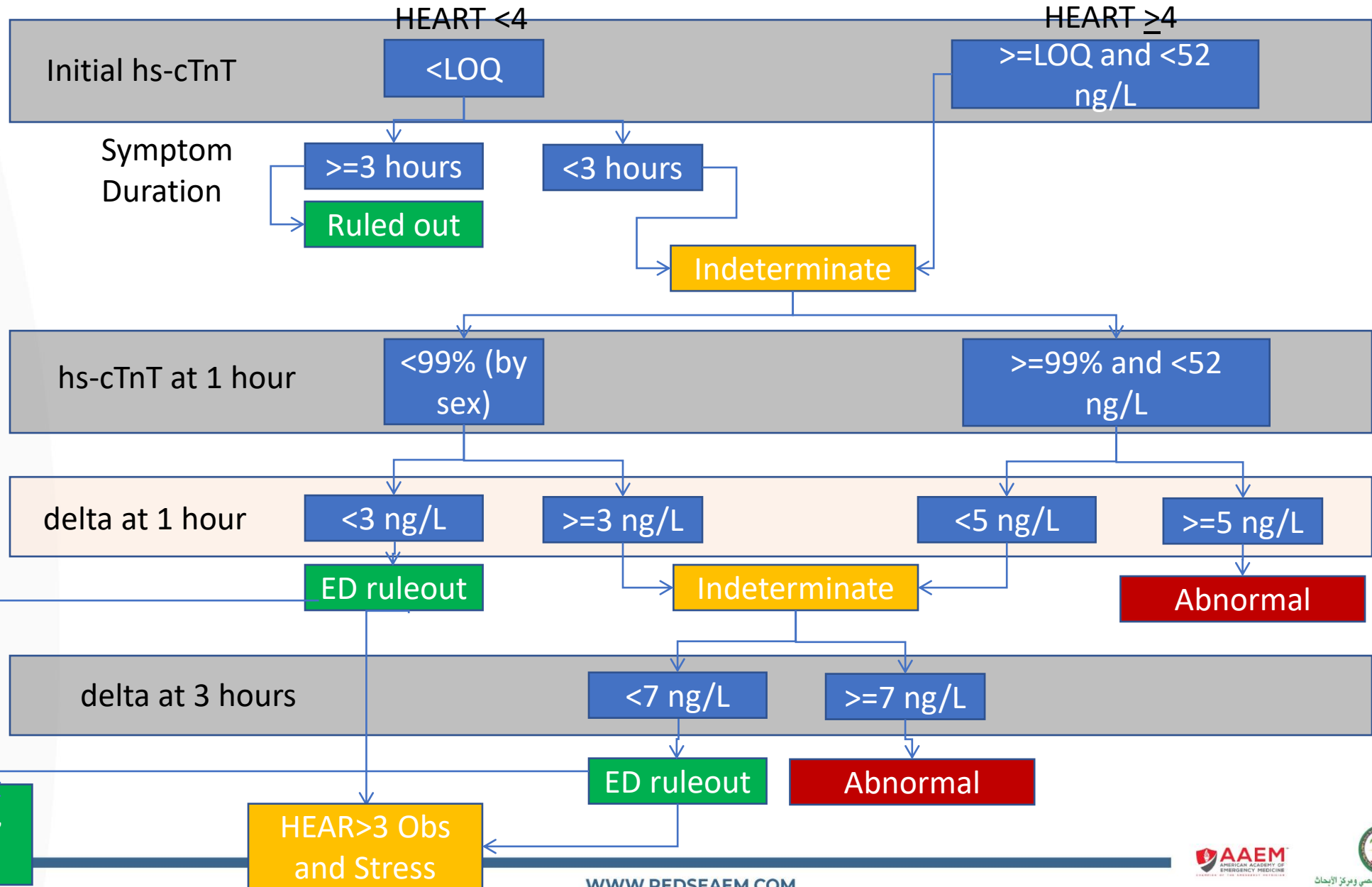
Level C recommendations.

- (1) In adult patients with suspected acute NSTEMI/ACS, conventional troponin testing at 0 and 3 hours among low-risk ACS patients (defined by HEART score 0 to 3) can predict an acceptable low rate of 30-day MACE.
- (2) A single high-sensitivity troponin result below the level of detection on arrival to the ED, or negative serial high-sensitivity troponin result at 0 and 2 hours is predictive of a low rate of MACE.
- (3) In adult patients with suspected acute NSTEMI/ACS who are determined to be low risk based on validated ADPs that include a nonischemic ECG result and negative serial high-sensitivity troponin testing results both at presentation and at 2 hours can predict a low rate of 30-day MACE allowing for an accelerated discharge pathway from the ED.



Sample hsTnI Pathway

hs-cTnT ≥ 52 ng/L is abnormal





Myocardial Infarction Can Be Safely Excluded by High-sensitivity Troponin I Testing 2 Hours After Emergency

Conclusions: Patients presenting >3 hours after the onset of suspected ACS symptoms, with at least two Beckman Coulter Access hsTnI < URL and at least one of which is below either the 10 or the 20% LoQ, had a 100% NPV for AMI. Two hsTnI values 1 to 3 hours apart with both < URL, but also >LoQ had inadequate sensitivity and NPV.

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Role of cardiac imaging

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3. In adult patients with suspected NSTEMI ACS in whom acute MI has been excluded, does further diagnostic testing (eg, provocative, stress test, computed tomography [CT] angiography) for ACS prior to discharge reduce 30-day MACE?

Patient Management Recommendations

Level A recommendations. None specified.

Level B recommendations. Do not routinely use further diagnostic testing (coronary CT angiography, stress testing, myocardial perfusion imaging) prior to discharge in low-risk patients in whom acute MI has been ruled out to reduce 30-day MACE.

Level C recommendations. Arrange follow-up in 1 to 2 weeks for low-risk patients in whom MI has been ruled out. If no follow-up is available, consider further testing or observation prior to discharge (Consensus recommendation).



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METHODS

We randomly assigned 5179 patients with moderate or severe ischemia to an initial invasive strategy (angiography and revascularization when feasible) and medical therapy or to an initial conservative strategy of medical therapy alone and angiography if medical therapy failed. The primary outcome was a composite of death from cardiovascular causes, myocardial infarction, or hospitalization for unstable angina, heart failure, or resuscitated cardiac arrest. A key secondary outcome was death from cardiovascular causes or myocardial infarction.

CONCLUSIONS

Among patients with stable coronary disease and moderate or severe ischemia, we did not find evidence that an initial invasive strategy, as compared with an initial conservative strategy, reduced the risk of ischemic cardiovascular events or death from any cause over a median of 3.2 years. The trial findings were sensitive to the definition of myocardial infarction that was used. (Funded by the National Heart, Lung, and Blood Institute and others; ISCHEMIA ClinicalTrials.gov number, NCT01471522.)

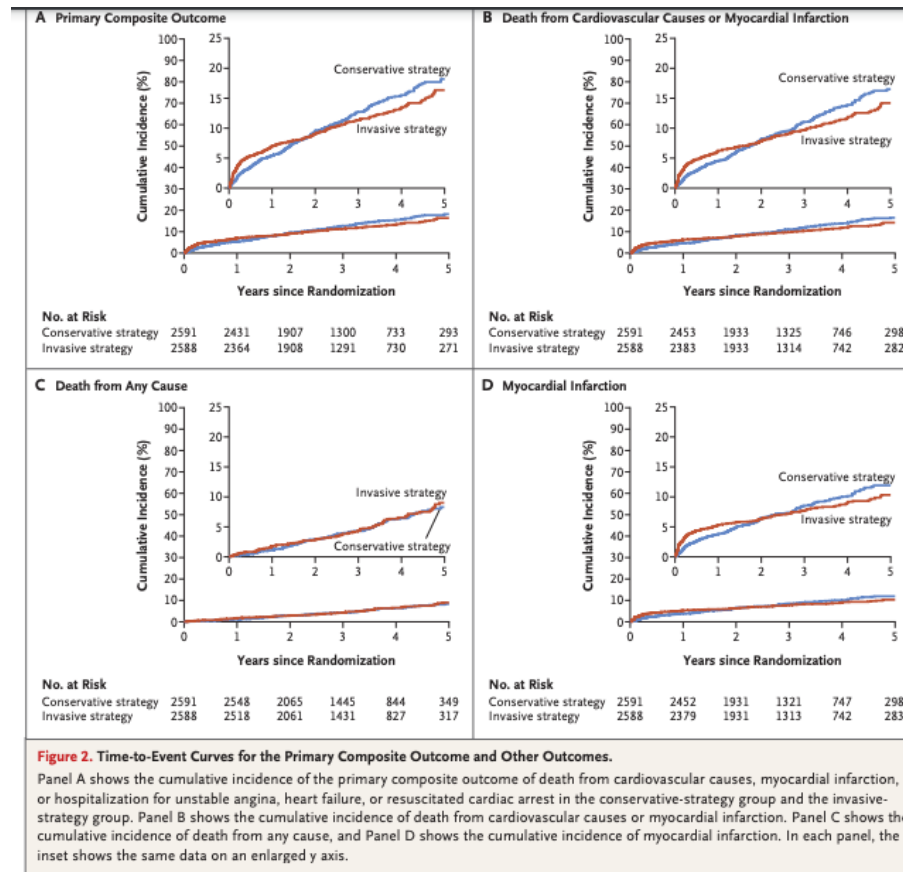
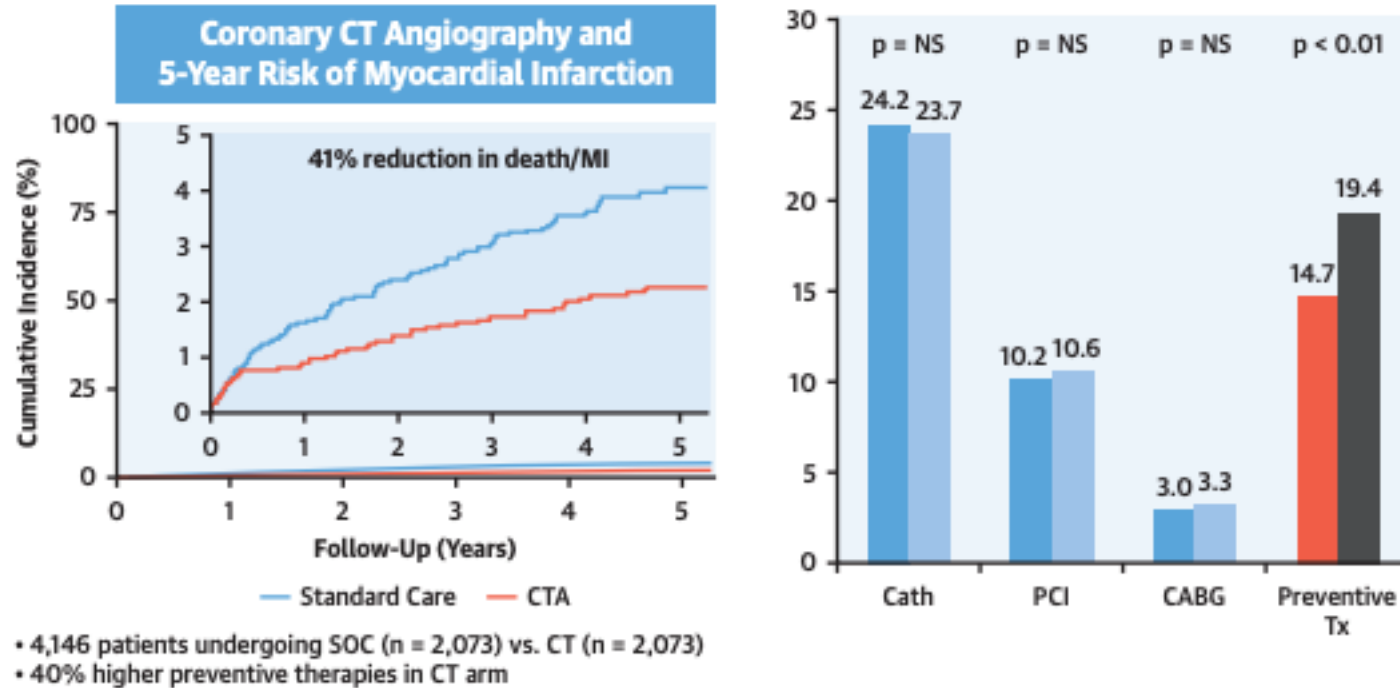


FIGURE 1 The SCOT-HEART Trial

Treating Atherosclerosis Improves Outcomes: SCOT-HEART



A coronary computed tomography (CT) angiography-first approach resulted in a 41% reduction in cardiac death and myocardial infarction (MI) and significantly more early initiation of preventive therapy (Tx). CABG = coronary artery bypass graft; Cath = catheterization; CTA = computed tomography angiography; NS = not significant; PCI = percutaneous coronary intervention; SCOT-HEART = Scottish Computed Tomography of the Heart; SOC = standard of care. Reprinted with permission from Newby et al. (1).

Conclusions

- 10-minute EKG for most patients presenting with CP
- Evidence-based serial troponin strategy
 - 0 and 3 hr troponin for conventional troponin
 - 0 and 2 hr for HS-troponin
- Use decision instruments – low risk patients should be discharged
- Reserve imaging for moderate and high risk patients
 - CCTA should be first line
 - Further develop strategy with Internal Medicine and Cardiology



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